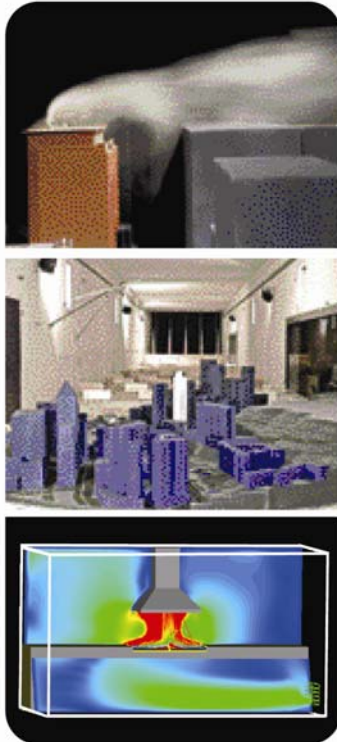


ANNEXURE O

WIND ASSESSMENT REPORT

Prepared by

CERMAK PETERKA PETERSEN

**FINAL REPORT**

Wind Assessment for:

**SYDNEY OLYMPIC PARK SITE 13**

Homebush, NSW, Australia

OD Partnership Pty. Ltd.

C/- AV Jennings

Level 2, 11 - 13 Brookhollow Avenue

Baulkham Hills

NSW 2153

May 2008

CPP Project: 4613

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## Introduction

Cermak Peterka Petersen Pty. Ltd. has been engaged by OD Partnership Pty. Ltd. to provide an opinion based assessment of the impact of the proposed development at Sydney Olympic Park, Site 13, on the pedestrian level local wind environment in and around the proposed development.

The proposal is for an 'A Grade' commercial office building consisting of a basement car park, mixed use ground level, 4 levels of office to Building A and 3 levels of office to Building B. Buildings A and B are on the eastern and western sections of the site respectively. The design proposal includes local landscaping of the public domain.

Site 13 is located at the south-west corner of Olympic Boulevard and Sarah Durack Avenue, Figure 1. The site is surrounded by a mix of grandstand and building structures associated with the sports and entertainment facilities of the Sydney Olympic Park precinct. The site is immediately to the north of the existing 3-storey State Sports Centre

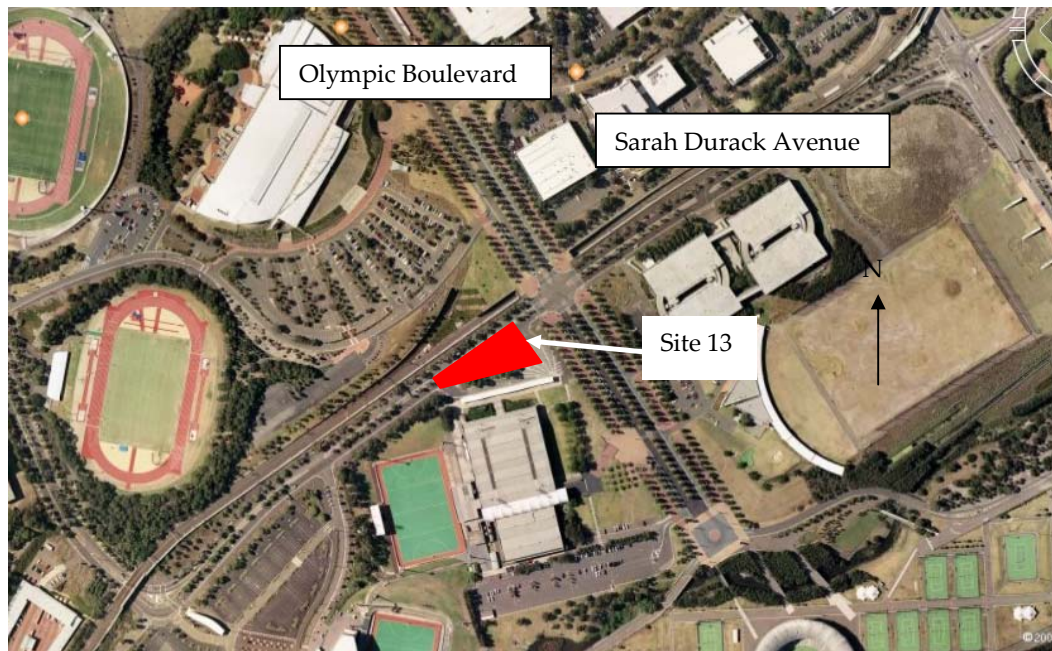


Figure 1 Location of the proposed development (Google, 2008)

Many factors influence wind conditions in and around the site including the ambient wind statistics, local topography, building massing, landscaping, and the proximity of similarly tall structures. The following qualitative study incorporates these factors and the conclusions of this report can be later validated by wind tunnel testing as the detailed design progresses.

## Homebush Wind Climate

The Bureau of Meteorology (BoM) anemometer site at Homebush is known to produce directionally biased wind measurements, due to its proximity to surrounding developments. For this study, an analysis of meteorological data from Bankstown Airport (BoM Station 066137) has been conducted to assess the local wind climate, and is considered representative of the Homebush wind environment for the purposes of this assessment.

Key characteristics of the Homebush wind climate are:

- Strong summer winds occur mainly from the southeast around to the west quadrants. Frequent lower intensity winds occur from the northeast. Winds from the south generally provide the strongest gusts during summer.
- Winter and spring winds occur mainly from the south and west quadrants. West quadrant winds will provide the strongest winds affecting the site throughout the year.

It is evident that strong prevailing winds are centred about the south-south-east and west quadrants. This wind assessment is focused on these prevailing wind directions.

### **Environmental Wind Speed Criteria**

Auburn Council development control plan contains no specific wind speed criteria. However, it is generally accepted that wind speed and the rate of change of wind velocity are the primary parameters that should be used in the assessment of how wind affects pedestrians. Local wind effects can be assessed with respect to a number of environmental wind speed criteria established by various researchers, e.g. Melbourne (1978, referenced by Sydney City and other Australian Councils) and Lawson (1990). Despite the apparent differences in numerical values and assumptions made in their development, it has been found that when these are compared on a probabilistic basis, there is remarkably good agreement. Common to the cited criteria is a suggested list of suitable human activities associated at various levels of wind intensity and regularity.

For consistency with the Melbourne and Lawson criteria, wind conditions in this qualitative report are described in terms of:

- Safety concerns - completely unacceptable for walking in main public accessways under the impact of strong gusty winds.
- Comfort of walking - generally acceptable for walking; wind conditions below safety concern.
- Short term stationary - generally acceptable for stationary short exposure activities (window shopping, or sitting in plazas).
- Long term stationary - generally acceptable for stationary, long exposure activities (outdoor alfresco dining).

Wind tunnel testing is required to quantify wind conditions at the site against the established criteria. This qualitative report is based upon experience gained from previous wind tunnel tests and field measurements.

### **Environmental Wind Assessment**

#### *West Quadrant Winds*

Westerly winds with a southerly bias currently flow along Sarah Durack Avenue with limited shielding and will be largely unimpeded on reaching Site 13. This is an existing wind condition and winds in the general vicinity of the development will be largely unaltered following construction of the proposed building given its limited size and height.

With the proposed development on the site however, wind conditions immediately adjacent the site will change. Winds along Sarah Durack Avenue will increase in speed around the proposed development and between building gaps due to wind channelling. Westerly winds will also impact with upper levels of the Building B western façade and a portion of these winds will deflect toward ground level accelerating around the development, Figure 2.

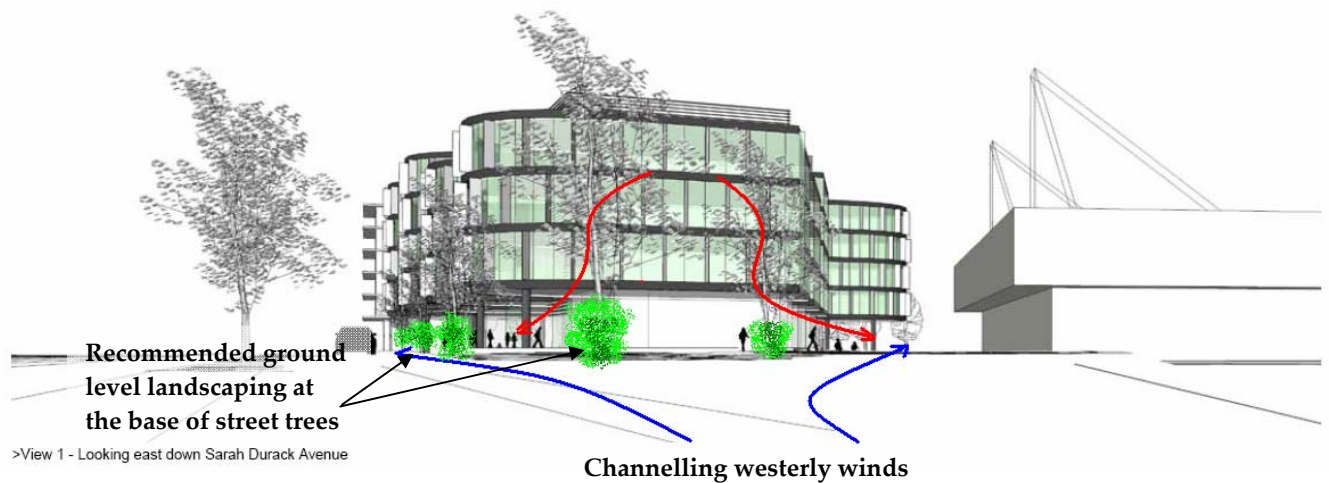


Figure 2: Interaction of westerly winds with the proposed SOP Site 13 development.

Channelling westerly winds will pass through the building colonnade facing Sarah Durack Avenue and will impact locally with lobby building entrance locations. Higher wind intensities approaching the walking criterion could be expected in the vicinity of these building entrances and in the absence of localised windbreak treatment. Current architectural drawings indicate air-lock rotating doorways will be used at building entrance locations facing Sarah Durack Avenue and these will protect indoor lobby areas from external wind impacts.

Channelling of westerly winds along Sarah Durack Avenue and between the southern side of the proposed development and the existing State Sports Centre are likely to approach walking criterion levels without windbreak treatment. Current architectural drawings indicate landscaping will be included toward the western end of the building gap, Figure 3. In order to effectively mitigate channelling winds, the tree species used at this location should include ever-green foliage extending from ground level to a minimum height of 6 m and should extend over the area shown in the drawings. Street tree landscaping as illustrated in Figure 2 will assist in the mitigation of these wind impacts and should also include shrub species concentrated around the base of the trees close to ground level as indicated in the Figure.

Further windbreak treatment will be required if the Sarah Durack colonnade area is to be used for stationary type activities such as cafes with alfresco dining. In this instance, localised screening will be required and could include windbreak barriers on the western side of any dining areas, e.g. combination planter box and non-porous plastic screens.

*South Quadrant Winds*

The existing State Sports Centre will provide some direct shielding to the impacts of southerly winds for areas in its immediate lee. Eastern sides of the proposed development however will receive limited shielding to prevailing south and southeast winds by upstream suburban development beyond the State Sports Centre. Channelling of southerly flows will occur along Olympic Boulevard and there will be some speed up of southerly winds due to the gentle rise in topography approaching the site from the south.

Channelling of southerly winds along Olympic Boulevard may approach walking criterion levels in the east colonnade area without windbreak treatment. Current architectural drawings however indicate footpath tree landscaping will be included along the eastern perimeter of the proposed development and should also include shrub species at the base of each tree and close to ground level as earlier recommended. With this landscaping winds are expected to remain below walking criterion wind intensities.

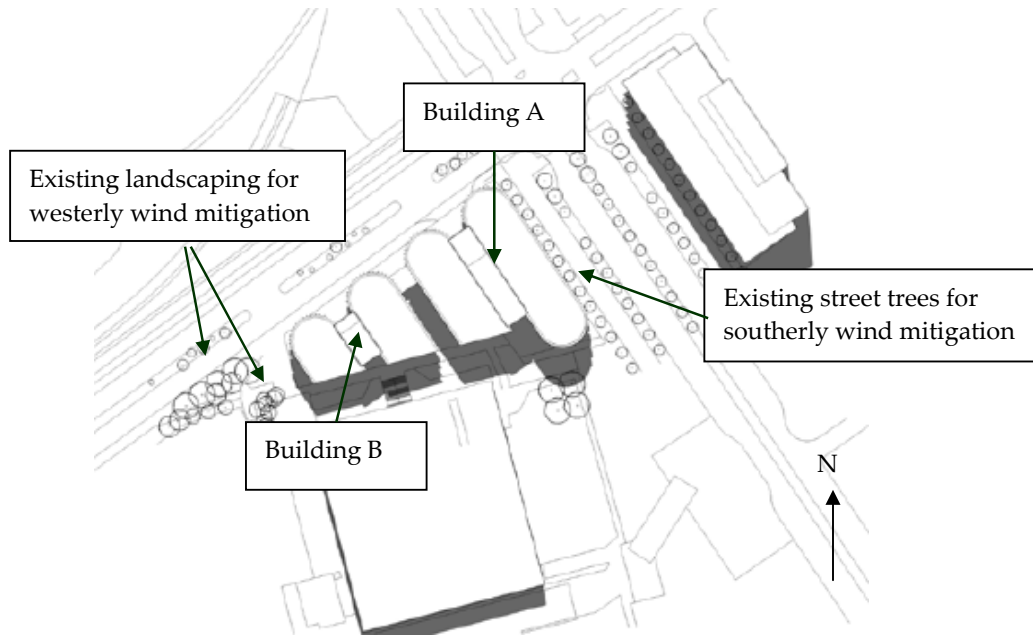


Figure 3: Critical street landscaping for wind mitigation.

A café dining area is proposed at the southeast corner of Building A, Figure 4. Due to accelerated flows in this area, it is considered that localised screening will be required to ensure suitable outdoor dining conditions throughout the year. Glass screening around the west and south perimeter of the café to a minimum height of 2 m should provide sufficient mitigation.

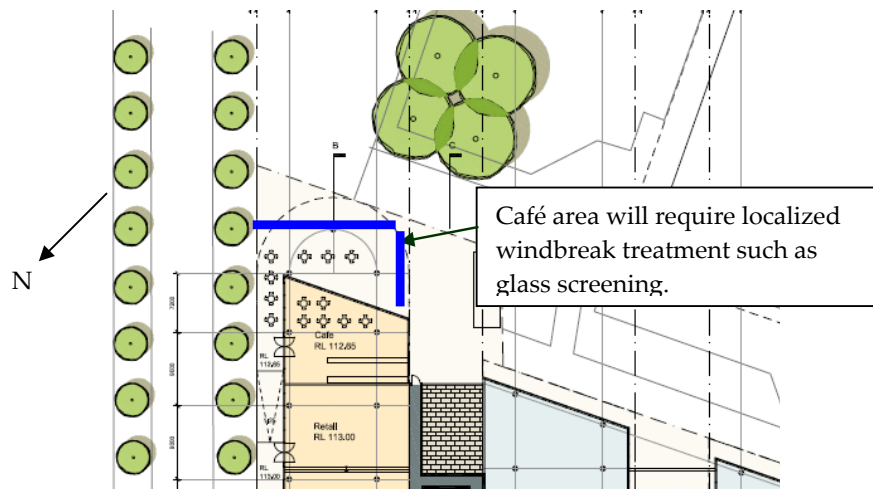


Figure 4: Ground Floor Plan – Café Location.

## Conclusions

Cermak Peterka Petersen Pty. Ltd. has provided an opinion based assessment of the impact on the local wind environment of the proposed development at Site 13, Sydney Olympic Park. Pedestrian level wind conditions in and around the site are expected to be similar to those currently experienced and acceptable for use as a main public accessway. Local wind conditions under the building colonnades and café area may be windy for stationary activities, but can be ameliorated with localised windbreak treatment.

## References

Lawson, T.V., (1990), The Determination of the wind environment of a building complex before construction, *Department of Aerospace Engineering, University of Bristol*, Report Number TVL 9025.

Melbourne, W.H., (1978), Criteria for environmental wind conditions, *J. Industrial Aerodynamics*, **3**, 241-249.

## Architectural Drawings

Assessment of wind effects in this report has been based upon Bates Smart Design Report and drawings below dated 14/03/08.

|                 |                                     |        |
|-----------------|-------------------------------------|--------|
| AR - EA - 2.01  | Basement Plan - Level 1 (L001)      | 1:500  |
| AR - EA - 2.03  | Floor Plan - Ground (L00)           | 1:500  |
| AR - EA - 2.04  | Floor Plan - Level 1-3 (L01-L03)    | 1:500  |
| AR - EA - 2.05  | Floor Plan - Level 4 (L04)          | 1:500  |
| AR - EA - 2.06  | Floor Plan - Level 5 (L05)          | 1:500  |
| AR - EA - 2.07  | Roof Plan (L06)                     | 1:500  |
| AR - EA - 5.01  | East Elevation                      | 1:500  |
| AR - EA - 5.02  | North Elevation                     | 1:500  |
| AR - EA - 5.03  | West Elevation                      | 1:500  |
| AR - EA - 5.04  | South Elevation                     | 1:500  |
| AR - EA - 5.05  | West Elevation - Internal Courtyard | 1:500  |
| AR - EA - 5.07  | Street Context Elevations           | 1:1000 |
| AR - EA - 6.01  | Section A-A                         | 1:500  |
| AR - EA - 6.02  | Section B-B                         | 1:500  |
| AR - EA - 21.01 | Shadow Analysis - Equinox           | NTS    |
| AR - EA - 21.02 | Shadow Analysis - Summer            | NTS    |
| AR - EA - 21.03 | Shadow Analysis - Winter            | NTS    |